PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Thomas M. BREUEL et al.	Group Art Unit: 2178
Application No.: 10/064,892	Examiner: C. PAULA
Filed: August 27, 2002	Docket No.: 111744

For: METHOD AND SYSTEM FOR DOCUMENT IMAGE LAYOUT DECONSTRUCTION AND REDISPLAY SYSTEM

DECLARATION UNDER 37 C.F.R. §1.131

I, William C. Janssen Jr., a named inventor in the above-identified application, hereby declare and state:

1. This Declaration is submitted as evidence that the subject matter claimed in Claims 1, 3-16 and 18-28 of the above-identified application was conceived by the named inventors and reduced to practice prior to July 13, 2001, the U.S. filing date of U.S. Patent Application Publication No. 2003/0014445 A1 (Formanek et al.).

2. I am a named co-inventor in the above-identified application.

3. I have personal knowledge of the function and existence of the computer programs, all dated prior to July 13, 2001, that appear in the directory listing set forth in Exhibit A attached to this Declaration.

4. In the directory listing of the computer programs identified in Exhibit A, dates and other material that could indicate dates have been masked out, to the extent practicable, as permitted under the U.S. patent rules.

5. The invention that was reduced to practice in the computer programs

identified in the directory listing in Exhibit A can be summarized as follows:

A system and method of converting a document in a page-image format into a form suitable for an arbitrarily sized display, the method comprising in sequential order the following steps. A document, in a page image format, is deconstructed by at least one of physical segmentation and logical segmentation into a set of segmented image elements. The deconstructed document is then synthesized into an intermediate data structure that is convertible into a commercially available format. The synthesizing includes integrating at least one of bitmapped images, including words in reading order, in an intelligible display layout and links to non-textual elements. The synthesizing also includes converting non-text image areas, layout properties and segmented image areas, into the intermediate data structure. The intermediate data structure is (1) capable of being stored in a storage device; (2) adaptable to at least one of display screen size, page size, resolution, contrast, color and geometry, at the time of display; and (3) adaptability supported by at least one of repagination of text, reflowing of text, logical links of text to associated text and non-textual content. The intermediate data structure is then distilled using commercially available software for redisplay by converting the intermediate data structure into a format usable for an arbitrarily sized display. This includes redisplaying the document in human readable format to include (1) at least one of an electronic book format, Internet browsable format and a print format; or (2) a device specific display format. The intermediate data structure is automatically adaptable at the time of display to constraints of display devices or circumstances of viewing.

6. The invention that was reduced to practice in the computer programs identified in the directory listing in Exhibit A was conceived prior to July 13, 2001. This

invention is claimed in the above-identified application.

7. On August 9, 2006, the inventions represented by the programs listed in Exhibit A were used to produce the intermediate format listed in Figure 2 of Exhibit B and thereby show the reduction to practice of a system and method of converting a document in a page-image format into a form suitable for an arbitrarily sized display as described in paragraph 6 herein, in which Figure 1 illustrates a document in a page-image format, Figure 2 illustrates its intermediate format, Figure 3 illustrates a dynamic reflow of the intermediate data format into a first arbitrarily sized display, and Figure 4 illustrates a dynamic reflow of the intermediate format into a second arbitrarily sized display.

8. I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and/or imprisonment under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing therefrom.

Date: 8/10/06

William C. Janssen Jr.

Exhibit A

```
% ls -l /project/cuda/janssen/seg1/chop.py /project/did/src/util/seg

-rwxr-xr-x   1 tbreuel  parc          80 Mar 11 [redacted] BatchSegmenter.sh

-rwxr-xr-x   1 tbreuel  parc          76 Mar 11 [redacted] ReflowHtml.sh
drwxr-xr-x   3 tbreuel  parc       25032 Feb 17 [redacted] data
-rw-r--r--   1 tbreuel  parc      163242 Mar 11 [redacted] seg.jar
-rwxr-xr-x   1 tbreuel  parc        1543 Feb 19 [redacted] show-rect
%
```

Exhibit B
Figure 1

Real-Time Control of a Virtual Human Using Minimal Sensors

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John P. Granieri

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Department of Computer and Information Science
University of Pennsylvania
Philadelphia, Pennsylvania 19104-6389

1 Abstract

We track, in real-time, the position and posture of a human body, using a minimal number of 6 DOF sensors to capture full body standing postures. We use 4 sensors to create a good approximation of a human operator's position and posture, and map it on to our articulated computer graphics human model. The unsensed joints are positioned by a fast inverse kinematics algorithm. Our goal is to realistically recreate human postures while minimally encumbering the operator.

2 Background

Ideally, a virtual environment interface should be able to measure and recreate a participant's posture exactly. Rather than the traditional "disembodied hand" approach, we would like to generate a complete, realistically postured human image. However, the equipment needed to accurately track every body segment (or joint angle) of a human is costly and cumbersome. We face several questions: how closely must the virtual human's posture match the operator's, and how much information do we need to achieve this degree of realism?

As in other areas of VR, the degree of realism necessary depends greatly on the tasks we would like to perform [11]. We have concentrated on creating an interface that will allow a human participant to perform basic tasks, using a minimal number of sensors to derive feasible, reasonably accurate postures. Three pieces of information are essential for our posture reconstruction algorithm: the participant's view vector, center of mass, and the location of the end-effectors the participant will use to interact with the

Figure 1: Sensor Placement and Support Polygon

Figure 2

view-source: - Source of: file:///tmp/xx/test/L000SYNindex.html - Mozilla Firefox

File Edit View

```
<HEAD>
<TITLE>L000SYN</TITLE>
<BODY>

<IMG SRC="L000SYN1.gif">
<IMG SRC="L000SYN2.gif">
<IMG SRC="L000SYN3.gif">
<IMG SRC="L000SYN4.gif">
<IMG SRC="L000SYN5.gif">
<IMG SRC="L000SYN6.gif">
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<IMG SRC="L000SYN43.gif">
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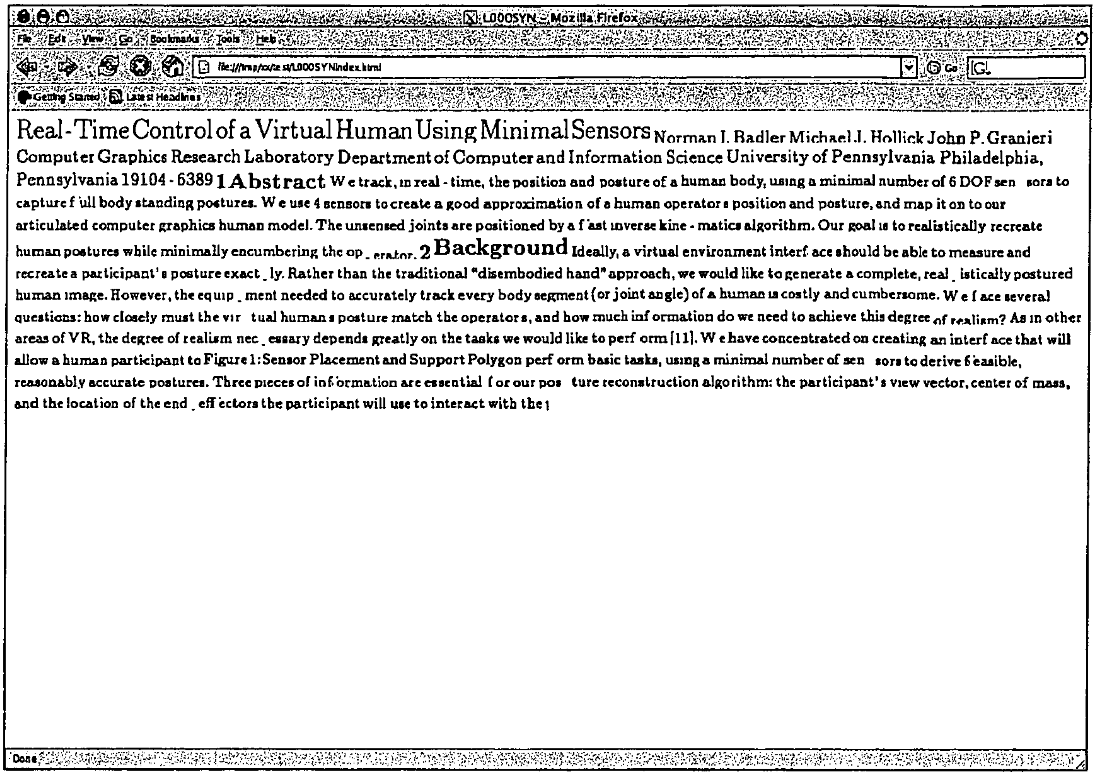
Figure 3



L000SYN - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

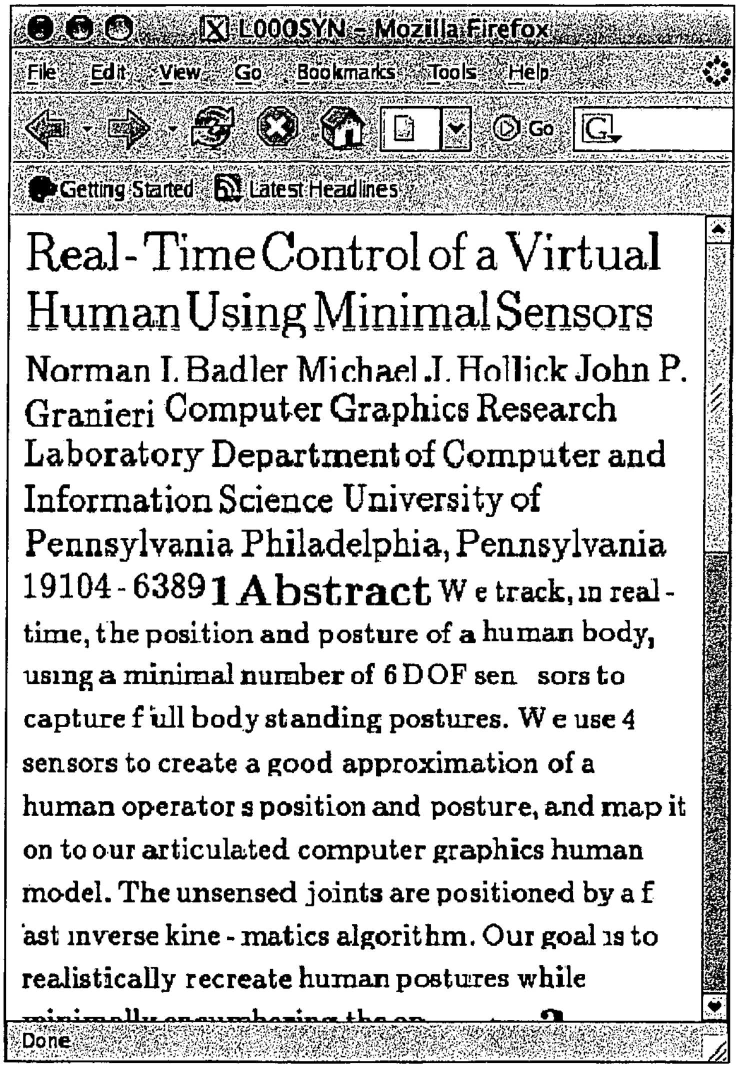
file:///tmp/oxte st/L000SYNindex.html

Getting Started Latest Headlines

Real-Time Control of a Virtual Human Using Minimal Sensors Norman I. Badler Michael J. Hollick John P. Granieri Computer Graphics Research Laboratory Department of Computer and Information Science University of Pennsylvania Philadelphia, Pennsylvania 19104 - 6389 **1 Abstract** We track, in real - time, the position and posture of a human body, using a minimal number of 6 DOF sen sors to capture f ull body standing postures. We use 4 sensors to create a good approximation of a human operator s position and posture, and map it on to our articulated computer graphics human model. The unsensed joints are positioned by a f ast inverse kine - matics algorithm. Our goal is to realistically recreate human postures while minimally encumbering the op _ erator. **2 Background** Ideally, a virtual environment interf ace should be able to measure and recreate a participant's posture exact _ ly. Rather than the traditional "disembodied hand" approach, we would like to generate a complete, real _ istically postured human image. However, the equip _ ment needed to accurately track every body segment (or joint angle) of a human is costly and cumbersome. We f ace several questions: how closely must the vir tual human s posture match the operator s, and how much inf ormation do we need to achieve this degree of realism? As in other areas of VR, the degree of realism nec _ essary depends greatly on the tasks we would like to perf orm [11]. We have concentrated on creating an interf ace that will allow a human participant to Figure 1: Sensor Placement and Support Polygon perf orm basic tasks, using a minimal number of sen sors to derive f easible, reasonably accurate postures. Three pieces of inf ormation are essential f or our pos ture reconstruction algorithm: the participant's view vector, center of mass, and the location of the end _ eff ectors the participant will use to interact with the

Done

Figure 4



Real-Time Control of a Virtual Human Using Minimal Sensors

Norman I. Badler Michael J. Hollick John P. Granieri Computer Graphics Research Laboratory Department of Computer and Information Science University of Pennsylvania Philadelphia, Pennsylvania 19104-6389 **1 Abstract** We track, in real-time, the position and posture of a human body, using a minimal number of 6 DOF sen sors to capture full body standing postures. We use 4 sensors to create a good approximation of a human operator s position and posture, and map it on to our articulated computer graphics human model. The unsensed joints are positioned by a fast inverse kine-matics algorithm. Our goal is to realistically recreate human postures while